Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matters of:	
Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to Mobile-Satellite Service and Radio Determination Satellite Service in the 1610-1626.5 MHz and 2483.5-2500 MHz Bands; and	CC Docket No. 92-166
Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-Geostationary Satellites.	ET Docket No. 92-28

JOINTLY FILED COMMENTS

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Summary

Loral Qualcomm Satellite Services, Inc. ("LQSS") and Motorola Satellite Communications, Inc. ("Motorola") submit these Joint Comments to report to the Commission that they have agreed upon a joint proposal for all of the applicants proposing to operate non-geostationary MSS/RDSS satellite systems to share the 1610-1626.5 MHz and 2483.5-2500 MHz bands. This joint proposal by two of the leading proponents of "Big LEO" satellite systems, if adopted by the Commission, will allow the first generation systems of all qualified applicants to coexist in this spectrum and will enable the Commission to proceed with licensing such systems expeditiously. Of particular note is the fact that under this joint proposal, both CDMA and FDMA/TDMA systems would be licensed in the usable MSS/RDSS spectrum.

The genesis of this joint proposal can be traced from the deliberations undertaken during the negotiated rulemaking phase of these proceedings, wherein the Committee's facilitator, in consultation with the Commission's representative on the Committee, offered several plans entitled "Elements of a Consensus" for reaching a compromise solution to sharing spectrum among the applicants. Since the proceedings of the Committee terminated last April, discussions among the applicants have continued regarding intraservice sharing of the L-band. LQSS and Motorola have reached agreement on an approach to shared use of the spectrum which is based on the first of the "Elements of a Consensus" proposals, but with some important clarifications and modifications.

LQSS and Motorola believe that their joint proposal represents a compromise which will serve the public interest by making mobile satellite communications service available to the public at the earliest practicable date and in a manner which avoids mutual exclusivity and auctions; permits the licensing of the non-geostationary MSS/RDSS systems proposed by all qualified applicants; and allows the marketplace to determine which competing systems and technologies best meet the needs of the public.

The essential features of this joint proposal are as follows:

(1) The Commission must allocate the entire 1610-1626.5 MHz (Earth-to-space) and 2483.5-2500 MHz (space-to-Earth) frequency bands on a primary basis for MSS/RDSS, as well as the 1613.8-1626.5 MHz band (space-to-Earth) on a secondary basis for MSS/RDSS, as proposed in its Notice of Proposed Rule Making in ET Docket No. 92-28. Both Motorola and LQSS believe that these proposed allocations can be made in accordance with the decisions reached at WARC-92 and without causing unacceptable levels of interference to other services in, and adjacent to, these bands. In this regard, the Commission should work with other agencies of the U.S. government and with other Administrations to find ways to make the entire spectrum allocated for MSS at WARC-92 usable for MSS/RDSS satellite systems.

(2) The Commission should establish as a legal and policy matter that eligibility for MSS/RDSS licenses in the 1610-1626.5 MHz and 2483.5-2500 MHz bands will be limited to non-geostationary MSS systems. Such systems offer a promising

technology with the ability to provide global handheld service before the end of this decade. Reserving this spectrum for non-geostationary satellites will give these systems an opportunity to expand to meet anticipated market demand without being crowded out by the currently authorized geostationary MSS system.

(3) The Commission should permit all qualified applicants to construct their proposed satellite systems with the capability to operate in the entire allocated frequency bands, in accordance with their applications and a specified milestone schedule. Such construction authority will provide the Commission with greater flexibility in assigning spectrum to those systems which become operational.

(4) The bidirectional FDMA/TDMA system would be assigned spectrum for both uplink and downlink transmissions starting in the upper portion of the 1610-1626.5 MHz band, with the downlink assignment on a secondary basis, and all other systems would be assigned spectrum for their uplink transmissions below the band assigned to the bidirectional system. Such assignments will minimize the potential for interference from the downlink operations of the bidirectional system to the Radio Astronomy Service ("RAS") in the 1610.6-1613.8 MHz band.

(5) CDMA systems may operate on an interference sharing basis and aggregate their assignments as each system becomes operational in the 1610-1626.5 MHz band. The entire 2483.5-2500 MHz band would be licensed only to those systems proposing to provide commercial MSS operations in that band with the capability to operate on a full band interference sharing basis for downlink transmissions.

(6) The Commission should assign spectrum initially on a "start big and cut back" basis, whereby each system is assigned spectrum as it becomes operational. As additional systems become operational, the available spectrum would be divided among the operational systems in proportion to their number. Until a system became fully operational, it would only be assigned a portion of its allotted spectrum. In addition, periodic adjustments of spectrum assignments would be made based upon actual usage over time by each operational system in accordance with a formula to be adopted by the Commission.

(7) In order to enable the proposed MSS/RDSS systems to be implemented in accordance with the various system configurations proposed, the Commission must authorize the use of acceptable feeder link spectrum in the 20/30 GHz band, as applied for by Motorola and TRW, as well as feeder links in bands below 15 GHz, and preferably below 10 GHz, for Ellipsat, Constellation and LQSS.

(8) The Commission should not accept any new satellite system applications for the MSS/RDSS bands until it is clear that there is sufficient spectrum available for additional entrants. While the 33 MHz of spectrum in these bands will accommodate the proposed non-geostationary systems currently before the Commission, it is extremely unlikely that this spectrum could accommodate any more new entrants. Additional MSS allocations should be made before consideration is given to accepting new system applications.

(9) The Commission should establish firm financial qualification standards for MSS/RDSS applicants that are at least

as rigorous as those standards which currently are in effect for the Domestic Fixed-Satellite Service because of the size of the capital investment required to construct and launch the proposed systems and the need to launch a significant number of satellites before any one system can provide MSS. The Commission should also adopt appropriate technical standards for systems operating in the 1610-1626.5/2483.5-2500 MHz bands in order to ensure that the limited spectrum resource is used in an efficient manner. In particular, the Commission should require that any MSS/RDSS system it licenses provide continuous coverage of the contiguous United States ("CONUS"). In addition to geographic coverage requirements, the Commission also should establish spectrum efficiency standards to ensure that MSS spectrum will be used in an efficient manner.

Accordingly, Motorola and LQSS request that the Commission promptly issue a Notice of Proposed Rulemaking which proposes adoption of rules and regulations incorporating this joint proposal for licensing the current group of applicants. In addition, the Commission should adopt the MSS allocations proposed in this proceeding and continue the parallel processing of the pending applications.

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JOINTLY FILED COMMENTS
OF
LORAL QUALCOMM SATELLITE SERVICES, INC.
AND
MOTOROLA SATELLITE COMMUNICATIONS, INC.

Loral Qualcomm Satellite Services, Inc. ("LQSS") and Motorola Satellite Communications, Inc. ("Motorola") (collectively referred to as the "Joint Commenters") hereby submit their joint proposal for sharing the 1610-1626.5 MHz and 2483.5-2500 MHz bands (the "MSS/RDSS bands") by the applicants proposing to operate non-geostationary satellite systems for the provision of Mobile-Satellite Service ("MSS") and Radio Determination Satellite Service ("RDSS") in these bands.[1/] The

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[1/] The Commission has accepted for filing six applications proposing satellite systems in these bands. See Public Notices, DA 91-407 (April 1, 1991); DA 91-1308 (Oct. 24, 1991).

joint proposal, if adopted by the Commission, will allow the proposed first generation systems (both FDMA/TDMA and CDMA) of all qualified applicants to coexist in this spectrum and will enable the Commission to proceed with licensing such systems expeditiously.

I. BACKGROUND

On January 6, 1993, the Commission chartered the MSS Above 1 GHz Negotiated Rulemaking Committee (the "Committee") to provide recommendations to be used in the formation of technical rules governing the provision of MSS in the MSS/RDSS frequency bands. In particular, the Committee was to make recommendations concerning intraservice sharing "to maximize multiple entry and to avoid or resolve mutual exclusivity among the non-geostationary satellite applicants, and between proposed non-geostationary and proposed or authorized geostationary satellite systems, while maintaining the economic viability of the systems."[2/]

Substantial technical analyses and evaluations for intraservice sharing were presented to the Committee. Two basic approaches to intraservice sharing of the L-band frequencies were examined. Motorola, whose proposed IRIDIUM™ system would employ FDMA/TDMA access techniques and operate bidirectionally in the L-

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2/ See "Report of the MSS Above 1 GHz Negotiated Rulemaking Committee," at 4 (April 6, 1993) ("Report").

band, advocated a "band segmentation" approach.[3/] LQSS and the other applicants proposing non-geostationary systems (TRW Inc., Constellation Communications, Inc. and Ellipsat Corporation) would employ CDMA access techniques to share the MSS/RDSS frequency bands. These applicants advocated a "full band interference sharing" approach.[4/] The Committee did not reach a consensus on a method for intraservice sharing of the bands.

Near the end of the Committee's deliberations, its facilitator, Dr. Edward Miller of NASA, in consultation with the Commission's representative on the Committee, Mr. Thomas S. Tycz, offered several plans entitled "Elements of a Consensus" for reaching a compromise solution.[5/] However, there was insufficient time at that point to explore fully whether any of these proposals, or some combination or modification of them, could form the basis for a consensus before the mandated deadline of the Committee's work.

Since the proceedings of the Committee terminated, discussions among the applicants have continued regarding intraservice sharing of the L-band. The Joint Commenters have reached agreement on an approach to shared use of the spectrum which is based on the first of the "Elements of a Consensus"

[3/] See Report, at Attachment 2 to Annex 1.

[4/] See Report, at Attachment 1 to Annex 1.

[5/] See Report, at Addendum 1. Several members of the Committee submitted written comments on the first "Elements of a Consensus" plan, which are also included in that Addendum.

proposals, but with some important clarifications and modifications.[6/]

The Joint Commenters believe that their proposal represents a compromise which will serve the public interest by making mobile satellite communications service available to the public at the earliest practicable date and in a manner which avoids mutual exclusivity and auctions; by permitting the licensing of the non-geostationary MSS/RDSS systems proposed by all qualified applicants; and by allowing the marketplace to determine which competing systems and technologies best meet the needs of the public.

II. THE JOINT PROPOSAL

The Joint Commenters' proposal for the sharing of spectrum by non-geostationary MSS/RDSS systems in the 1610-1626.5 MHz and 2483.5-2500 MHz bands draws upon the original "Elements of a Consensus" plan. There are some differences, however, which the Joint Commenters believe improve upon and clarify that "Elements of a Consensus" proposal.

A. Essential Features of the Joint Proposal

The following are essential features of a band sharing plan that will avoid mutual exclusivity and afford all qualified

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[6/] We have so far been unable to reach agreement with the other applicants who were invited to join in the preparation of this filing.

applicants an opportunity to implement their proposed non-geostationary MSS/RDSS satellite systems[7]:

(1) The Commission must allocate the entire 1610-1626.5 MHz (Earth-to-space) and 2483.5-2500 MHz (space-to-Earth) frequency bands on a primary basis for MSS/RDSS, as well as the 1613.8-1626.5 MHz band (space-to-Earth) on a secondary basis for MSS, as proposed in its Notice of Proposed Rule Making in ET Docket No. 92-28.[8] If any MSS/RDSS band sharing plan is to avoid mutual exclusivity while maintaining the economic viability of the proposed systems, it is imperative that the Commission allocate the entire 16.5 MHz of spectrum in the L-band to MSS and avoid imposing overly restrictive operating conditions in the lower portion of that band.[9] In this regard, the Joint

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[7] The Joint Commenters also propose certain financial and technical qualification standards for all MSS/RDSS applicants. See Section II B. Moreover, these comments are predicated upon certain assumptions as to the technical designs of the current group of applicants. The Joint Commenters believe that the Commission should not allow any applicant to change, at this late date, the fundamental design of its proposed satellite system by switching its multiple access technique, as set forth in its application (or as amended during the negotiated rulemaking proceeding), and remain in the current processing group. The joint proposal does not necessitate such a change in system parameters since both FDMA/TDMA and CDMA access techniques are accommodated.

[8] See Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites, 7 FCC Rcd 6414 (1992).

[9] These overly restrictive conditions sought by the aviation community would result in the lower 6 MHz of the proposed MSS/RDSS bands becoming unusable for MSS/RDSS operations and a significant guard band of up to 4 MHz between MSS subscriber terminal operations and GLONASS operations.

Commenters submit the attached Technical Appendix, which makes the following points:

(a) The 1992 World Administrative Radio Conference ("WARC-92") allocated the entire 1610-1626.5 MHz band for MSS worldwide on a co-primary basis and established coordination criteria.[10/] The protection from interference afforded other services in, and adjacent to, this band that are contained in certain ITU footnotes should not be read to preclude altogether MSS operations in any portion of the band. The Commission should work with other agencies of the U.S. government and with other Administrations to find ways to make the entire spectrum allocated for MSS at WARC-92 usable for MSS/RDSS satellite systems. In particular, it is critical that the GLONASS frequency plan be reconfigured so that its C/A code at band edge operates no higher than 1605.4 MHz when GLONASS is utilized as a component of Global Navigation Satellite System ("GNSS").

(b) The international aviation community's proposed protection limits for GLONASS receivers are overly restrictive. The receivers, now in the prototype development stage, should be designed so that MSS systems can operate in the entire 1610-1626.5 MHz frequency band. The aviation community should develop standards and technologies for GNSS receivers (which receive both GPS and GLONASS satellite signals) which take account of MSS operations at 1610 MHz and above. Considering the

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[10/] The Radio Astronomy Service ("RAS") was also upgraded to primary status in a portion of the band.

fact that GNSS will consist of both GPS and GLONASS satellite systems, the impairment of some GLONASS transmissions because of interference caused by the earth stations of an MSS system is extremely unlikely to reduce the quality of the measurements, from the number of available GNSS satellites in view with adequate geometries, below that required for navigational reliance. GPS satellites alone will provide the required number of four measurements for this navigational reliance, while the fifth measurement from GLONASS satellites provides the system integrity requirement sought by the aviation community.

(c) The United States should encourage the Russian Federation to take certain actions with respect to GLONASS that will enable MSS/RDSS systems to operate in the entire 1610-1626.5 MHz frequency band. These actions were identified in the Report of the Committee,[11/] and include frequency re-use on antipodal GLONASS satellites and shifting down of the GLONASS frequencies. The Russian Federation recently signed coordination agreements with both the Japanese and Australian governments concerning GLONASS operations in an attempt to reduce interference into Radio Astronomy operations. These agreements appear to provide that, as a first step, by 1998 GLONASS would operate with center frequencies lower than 1608.1875 MHz. As a second step, center frequencies would be reduced below 1604.8125 MHz as early as possible. These agreements are described further in the attached Technical Appendix.

11/ See Report, at 20-21.

(d) Acceptance of the protection limits proposed by the aviation community would unfairly penalize U.S. systems relative to international systems which are now causing or when implemented will cause substantially higher levels of interference into user receivers of GLONASS satellites.

(e) The Commission should take action at the next competent WRC to have the final sentence of international Footnote 731E deleted.[12/] That sentence creates considerable ambiguity about the status of the Mobile-Satellite Service vis-a-vis the aeronautical radionavigation service and GLONASS. Since the Russian Federation apparently is now willing to revise the GLONASS frequency plan to operate below 1610 MHz, deletion of this sentence should be acceptable to it.

(2) The Commission should establish as a legal and policy matter that eligibility for MSS/RDSS licenses in the 1610-1626.5 MHz and 2483.5-2500 MHz bands will be limited to non-geostationary systems.

(a) First, AMSC Subsidiary Corporation ("AMSC") is the only pending applicant proposing to use geostationary satellites in the MSS/RDSS bands. However, AMSC has already been assigned a domestic monopoly in 30 MHz in the L-band for its MSS

12/ This sentence reads as follows:

> Stations of the mobile satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 732 and stations in the fixed service operating in accordance with the provisions of No. 730.

system.[13] The 33 MHz of L-band and S-band spectrum currently under consideration in these proceedings can best be utilized by granting only to the qualified applicants proposing non-geostationary systems exclusive access to these bands.[14]

(b) Second, non-geostationary MSS/RDSS systems offer a promising technology with the ability to provide global handheld service before the end of this decade. Reserving this spectrum for non-geostationary satellites will give these systems an opportunity to expand to meet anticipated market demand without being crowded out by the currently authorized geostationary MSS system.

(3) The Commission should permit all qualified applicants to construct their proposed satellite systems with the capability to operate in the entire allocated frequency bands, in accordance with their applications and a specified milestone schedule. This proposal is consistent with the "Elements of a Consensus" plans which similarly called for construction and licensing of all of the proposed systems across the entire 1610-1626.5 MHz band in the uplink direction, with the proposed IRIDIUM™ system being constructed and licensed to operate in the

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[13] In 1989, the Commission granted AMSC a license to provide domestic MSS in the 1545-1559 MHz and 1646.5-1660.5 MHz bands. See Memorandum Opinion, Order and Authorization, 4 FCC Rcd. 6041 (1989). The Commission recently modified AMSC's authorization to add the 1544-1545 MHz and 1645.5-1646.5 MHz bands. Memorandum Opinion and Order, FCC 93-243, ¶ 37 (released June 14, 1993).

[14] All applicants are aware of the potential availability of additional spectrum for MSS in the Maritime-Mobile Satellite Service band (1530-1544 MHz and 1626.5-1645.5 MHz) when the Commission lifts the current freeze on applicants for those bands. See First Report and Order (Dkt. No. 90-56), FCC 93-255 (released June 11, 1993), and comments submitted in that docket.

downlink direction on a secondary basis in the 1613.8-1626.5 MHz band, and the CDMA systems being constructed and licensed to operate across the entire 2483.5-2500 MHz downlink band.[15/] Such construction authority will provide the Commission with greater flexibility in assigning spectrum to those systems which become operational.[16/]

(4) The bidirectional FDMA/TDMA system would be assigned spectrum for both uplink and downlink transmissions starting in the upper portion of the 1610-1626.5 MHz band, with the downlink assignment on a secondary basis, and all other systems would be assigned spectrum for their uplink transmission below the band assigned to the bidirectional system. Within the band 1610-1626.5 MHz, secondary downlinks would be assigned only in those frequencies also assigned for primary uplink transmissions of the bidirectional FDMA/TDMA system. Such assignments will minimize the potential for interference from the downlink operations of the bidirectional system to the Radio Astronomy Service ("RAS") in the 1610.6-1613.8 MHz band. In addition, placing the bidirectional system in the upper portion of the band is consistent with the Commission's proposed secondary allocation for bidirectional operation in the 1613.8-

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15/ See Report, at Addendum 1.

16/ By allowing systems to construct over the entire spectrum, and channelizing each system by frequency division (FDMA/TDMA or FDMA/CDMA) -- which all of the applicants have proposed -- individual system operations can contract (as new entrants become operational) or expand (if other systems fail to meet their milestones) as the need arises.

1626.5 MHz band.[17] Applicants proposing to deploy CDMA systems do not propose to operate bidirectionally, and their uplinks can avoid interference to RAS sites during observation periods through the establishment of protection zones in the 1610.6-1613.8 MHz band.[18] However, the CDMA systems will require access to some spectrum above the common band edge with RAS at 1613.8 MHz to accommodate MSS users whose assigned channels are within these protection zones, with adequate consideration for out-of-band emissions.[19]

(5) CDMA systems may operate on an interference sharing basis and aggregate their assignments as each system becomes operational in the 1610-1626.5 MHz band. The entire 2483.5-2500 MHz band would be licensed only to those systems proposing to provide commercial MSS operations in that band with the capability to operate on a full band interference sharing basis for downlink transmissions.[20]

(6) The Commission should assign spectrum initially on a "start big and cut back" basis, whereby each system is assigned

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[17] See Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-geostationary Satellites, 7 FCC Rcd at 6418 ¶¶ 28-29 (1992).

[18] See Report at 36-37, 40-41.

[19] Id. at 41-42.

[20] During the negotiated rulemaking, the CDMA applicants and other proponents of CDMA systems who were members of the Committee agreed on technical recommendations and rules governing interference sharing. The Joint Commenters recommend that the Commission adopt these proposed rules and recommendations for those portions of the bands which will be assigned to systems capable of interference sharing. See Report, Attachment 1 to Annex 1.

spectrum as it becomes operational, with the first system to become operational authorized to operate over all of the available spectrum, and as additional systems become operational, the available spectrum would then be divided among the operational systems in proportion to their number. Until a system became fully operational, it would only be assigned a portion of its allotted spectrum. CDMA systems may operate on an interference sharing basis and aggregate their assignments as each system becomes operational in the MSS/RDSS bands. In addition, periodic adjustments of spectrum assignments would be made based upon actual usage over time by each operational system in accordance with a formula to be adopted by the Commission.

(7) The Joint Commenters agree with the basic premise of the "Elements of a Consensus" plans that licensees should be assigned spectrum only as they become operational. The Commission should authorize an MSS/RDSS permittee to operate in the available spectrum when at least some defined portion of its authorized satellite constellation is in orbit and operationally ready to provide commercial MSS/RDSS service.[21/] (Of course, this approach would not preclude in-orbit testing of satellites or experimental operations.) The discussion that follows assumes that each satellite system can provide commercial MSS service

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21/ The Commission should prescribe a rule to the effect that to be deemed operationally ready to provide commercial MSS services, a permittee would have to certify to the Commission that it is ready, willing and able to provide some commercial MSS service to CONUS, and that some portion -- e.g., 50 percent -- of its authorized satellites are in final orbit and the operations of such satellites conform to the terms and conditions of the authorization.

once at least 50 percent of the satellites of its authorized constellation are in orbit and operationally ready. The amount of spectrum assigned to a satellite system when less than all of its satellites are operational would be rounded up to an integer number of channels,[22] and would not be subject to subsequent reduction in the event of a failure of a satellite after it has become operational.

(a) The first satellite system to become operationally ready to provide commercial MSS, with at least fifty (50) percent of its authorized satellite constellation in orbit and operational, would be authorized to operate in at least half of the 1610-1626.5 MHz band for uplink transmissions (and the 1613.8-1626.5 MHz band for downlink transmissions if the bidirectional FDMA/TDMA system were first) until a second MSS system became operationally ready, with at least fifty (50) percent of its authorized satellites in orbit and operational.[23] If both of these systems utilize CDMA access techniques, then they would be permitted to operate in the entire uplink and downlink bands on an interference sharing basis.[24]

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[22] This assumes a channelization of 1.25 MHz or less.

[23] This approach is slightly different than the original "Elements of a Consensus" plan which apparently would have assigned spectrum to a permittee as soon as it launched its first satellite. Such an approach does not take into account the fact that commercial MSS voice services over CONUS cannot be provided for any significant length of time with just one non-geostationary satellite.

[24] See note 20, supra. In order for CDMA systems to share spectrum on an interference sharing basis, each must separately meet the operational requirements set forth above, and must be a stand-alone system separate from any other operational systems.

If one of these first two systems operates bidirectionally using FDMA/TDMA access techniques, then the "usable" spectrum would be determined.[25/] The "usable" bandwidth would consist of the entire 1610-1626.5 MHz frequency band, less any guard band necessary between the segments assigned to the FDMA/TDMA and CDMA systems, and less any guard band at the lower band edge necessary for GNSS protection.[26/] Initially, if one of the first two systems to become operational were bi-directional, using FDMA/TDMA access techniques, this usable bandwidth would be divided into two equal segments and adjusted as described below. This division of the usable bandwidth would take into account a weighing factor for that portion of the spectrum which is affected by Radio Astronomy operations, in recognition of the fact that access to this portion of the spectrum by CDMA systems

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25/ The system operator or operators assigned spectrum in the lowest portion of the band would determine the lower boundary of that spectrum usable by it or them due to the interference protection requirements related to Aeronautical Radionavigation operations. Determinations as to the lower boundary would be subject to review by the Commission to assure that there is a valid technical basis for them. The determination of the affected system operator as to the lower boundary would be implemented pending any review by the Commission. Only the portion of the band which is deemed to be usable would be divided amongst all of the system operators. The Joint Commenters believe that the Commission should take all actions necessary to ensure that the spectrum between 1610-1626.5 MHz is fully usable by MSS system operators.

26/ Although it is not anticipated that any guard band will ultimately be required if Aeronautical Radionavigation operations are conducted as now apparently proposed by the Russian Federation in frequencies below 1605.4 MHz, the Russian Federation may operate GLONASS at center frequencies up to 1608.1875 MHz for some undetermined period, in which event some guard band may be required. In no case is it anticipated that this guard band will be required at frequencies above 1616 MHz. See Technical Appendix hereto.

would be limited to protect Radio Astronomy against unacceptable interference from MSS transmissions during RAS observations. All of the usable bandwidth would be assigned. Assignments of usable spectrum would also take into account the channelization of the proposed systems so that assignments to CDMA systems would provide them with an integer number of channels.[27/] When a third system is operationally ready, with at least fifty (50) percent of its authorized satellites in orbit and operational, the usable bandwidth would be divided and adjusted among the three systems in a similar manner. This process would continue as all five non-geostationary systems became operationally ready to provide commercial MSS services.[28/] These spectrum assignments are subject to (b) and (c) below.

(b) During the period in which a system has launched more than 50 percent, but not all, of its authorized satellites, the Commission could have the flexibility to make another interim assignment of spectrum to such a system. However, a satellite system would receive its full spectrum assignment only when all of its authorized satellites are operational.

(c) At some point in time after all systems have become operational and the market share of each system is known, the Commission should adjust the spectrum assignments to reflect usage among the various systems. The original "Elements of a

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27/ See note 22, supra.

28/ In each instance, the CDMA systems could combine their spectrum and operate on an interference sharing basis in both the uplink and downlink bands.

Consensus" plan contemplated such an adjustment of spectrum assignments.

(8) In order to enable the proposed MSS/RDSS systems to be implemented in accordance with the various system configurations proposed, the Commission must authorize the use of acceptable feeder link spectrum. Such authorizations should include feeder links in the 20/30 GHz band, as applied for by Motorola and TRW, as well as feeder links in bands below 15 GHz, and preferably below 10 GHz, as applied for by Ellipsat, Constellation and LQSS.

(a) With regard to feeder links in the 20/30 GHz bands, spectrum should be authorized to applicants on a dedicated basis. In addition, the Commission must ensure that MSS/RDSS feeder link spectrum in the 20/30 GHz range is not allocated for terrestrial services, such as the Local Multipoint Distribution Service ("LMDS").

(b) Feeder links in lower bands, preferably below 10 GHz, must be made available for MSS/RDSS systems which propose to utilize substantial numbers of gateway earth stations. The cost of the gateway earth stations will be substantially lower at the lower feeder link frequencies due to the lower cost of components. The need to compensate for significant rain attenuation at the higher feeder link frequencies with gateway site diversity involving additional cost would not be required if the lower feeder link frequencies were utilized. System architectures which contemplate interconnection with numerous terrestrial networks will require low-cost feeder link (gateway)

earth stations which will not involve extensive coordination with terrestrial services or the Fixed-Satellite Service. The feeder link spectrum allocated also should be available for use both within and outside the United States without the requirement for significant international coordination. The Commission should take the necessary steps with the Interdepartment Radio Advisory Committee ("IRAC") to gain approval to make available the 5150-5250 MHz band (space-to-Earth) for feeder links for MSS/RDSS systems, and to identify conditions that would permit sharing of this band with aeronautical radionavigation. In addition, the Commission should seek to revise Footnote 797A at a future World Radiocommunication Conference to add MSS to the services permitted for the 5150-5250 MHz band. This band is not allocated for FSS service and is lightly used on a global basis. Past plans by the aeronautical community to utilize this band for a microwave landing system have not been implemented. In conjunction with efforts to make available the 5150-5250 MHz available for MSS/RDSS feeder downlinks, the Commission should review 6 GHz spectrum in order to identify, if at all possible, spectrum which could be utilized for MSS/RDSS feeder uplinks. If spectrum in the 5 and 6 GHz bands cannot be made available for feeder links for MSS/RDSS systems, the Commission should authorize use of bands below 15 GHz, and preferably below 10 GHz.

(9) The Commission should not accept any new satellite system applications for the MSS/RDSS bands until it is clear that there is sufficient spectrum available for additional entrants. While the 33 MHz of spectrum in these bands will accommodate the

proposed non-geostationary systems currently before the Commission, it is extremely unlikely that this spectrum could accommodate any more new entrants. The Commission should allocate additional MSS spectrum to allow for growth of the systems in the current processing group.[29/] Additional MSS allocations should be made before consideration is given to accepting new system applications.

B. Further Discussion of the Joint Proposal

1. The Commission Must Consider the Financial and Technical Qualifications of the Applicants

The Commission has traditionally required satellite applicants to demonstrate their financial ability to construct, launch and operate their systems and their technical qualifications prior to awarding authorizations. Such requirements will ensure that MSS/RDSS services are made available as quickly as possible and that the spectrum is used efficiently and in a way that meets the needs of the public to the maximum extent. There is ample precedent for the adoption of such standards while processing a closed group of applications

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[29/] See Comments of Motorola, LQSS, and Constellation Communications, Inc. in Gen. Dkt. No. 90-56, Rm-6459 (filed Sept. 8, 1993).